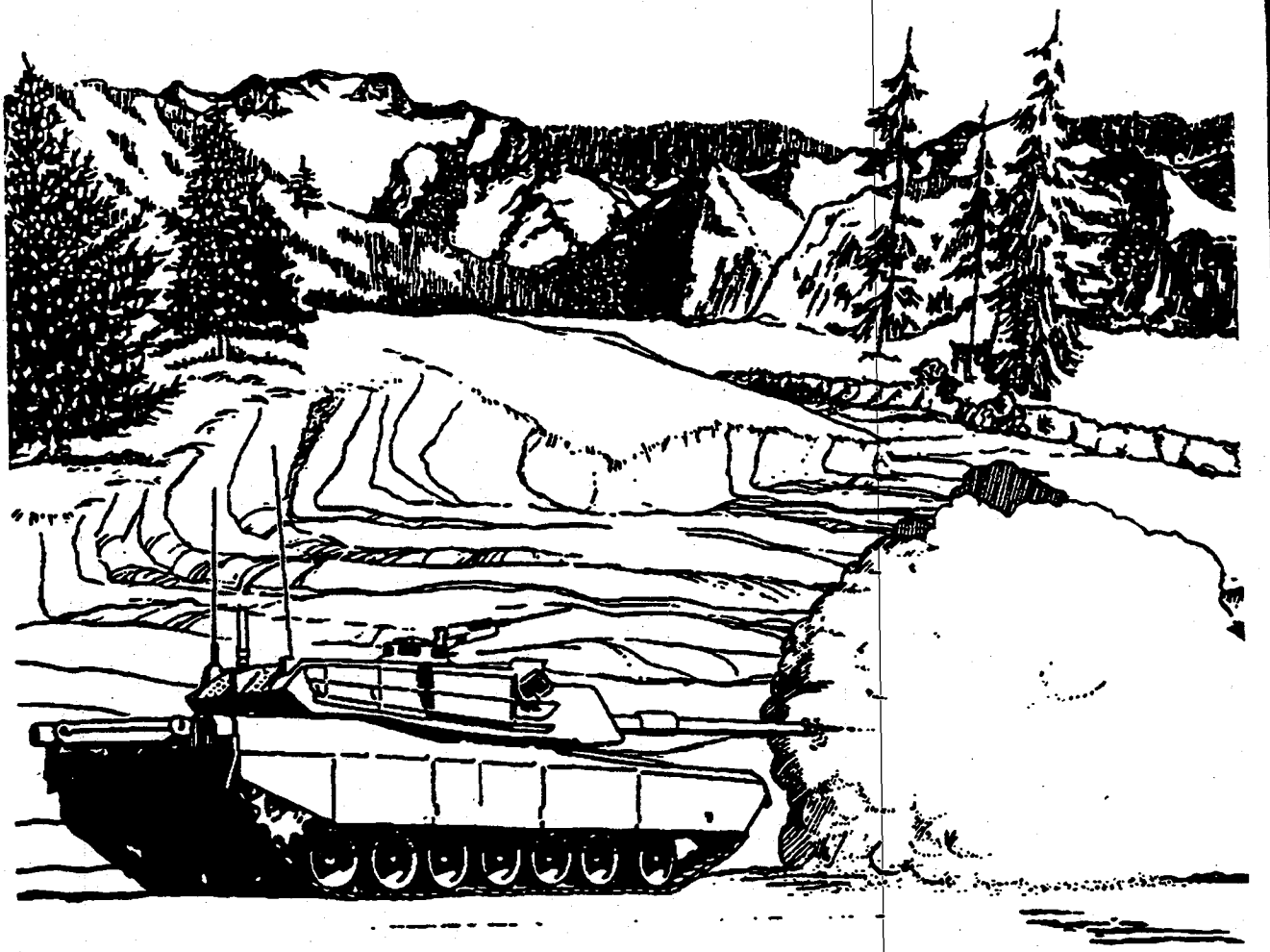
TANK GUNNERY LESSONS LEARNED



1940 50 Years of Forging the Thunderbolt 1990

WEAPONS DEPT. • FORT KNOX, KY

APRIL 1990

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DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY ARMOR SCHOOL
FORT KNOX, KENTUCKY 40121-5200

ATSB-AC

9 Jan 90

MEMORANDUM FOR ARMOR TRAINERS

SUBJECT: Tank Gunnery Lessons Learned

1. We continually receive and review input from the both Active and Reserve Component Units on the employment of armor. Our focus in this Lessons Learned bulletin is to give you training and readiness points that have been collected from Live Fire Gunnery around the world. From the exceptional precision gunnery required by the CAT teams, to the NTC Live Fire, annual qualification, and off-cycle train-up, we have assembled this collection of techniques to help you put steel on target quicker, more effectively and more safely.

2. We need to maximize the capabilities of our equipment. Gunnery to standards will place us closer to one kill for each main gun round fired.

3. If you have learned some lessons the 'hard' way and we haven't covered it in this bulletin, write, call, or TWX your lessons to the Weapons Department at:

CDR, USAARMC
ATTN: ATSB-WP-GD
Ft Knox, KY 40121-5000

Phone numbers are AUTOVON 464-1246/1736/3129, commercial 502-624-1246/1736/3129, FAX is 502-624-5708.

J. B. TAYLOR
Brigadier General, US Army
Assistant Commandant

Prep-to-Fire Checks

Reference:

M-1 Table 2-2, pages 2-69 - 2-81, TM 9-2350-255-10-1
M1A1 Table 2-2, pages 2-79 - 2-91, TM 9-2350-264-10-1

Too often a crew is asked "have you completed prep to fire checks?" and they respond, "affirmative". When asked detailed questions it becomes obvious that the crew is unfamiliar with the prepare to fire checks and has, in fact, not completed them. This failure to perform the checks may result in either an unqualified crew, or targets engaged but not hit or unsafe conditions for firing.

The lack of familiarity with the proper checks can stem from a lack of emphasis on performing PMCS and other checks "by-the-book". Often a unit or crew is performing maintenance or prep-to-fire checks using a combination of oral tradition and mythology. "SGT so-and-so said to do it this way" or "I heard from a guy I know that if you do this, you'll hit targets all day long."

A way to combat this lack of familiarity and to debunk the myths is to conduct classes on the fire control system. They should be instructed by the battalion or company master gunner, or both. The class should also cover the components of the Abrams' Fire Control and their functions in relation to one another. The class should also include a discussion of the various factors involved in a complete and operational system. Prepare to fire checks should be covered with emphasis on how, why, when and where prepare to fire checks are conducted. The proper references that are required to conduct the checks should be covered as well as a detailed discussion of each check.

These classes should be presented early in the train-up process, to provide a solid foundation for follow-on training.

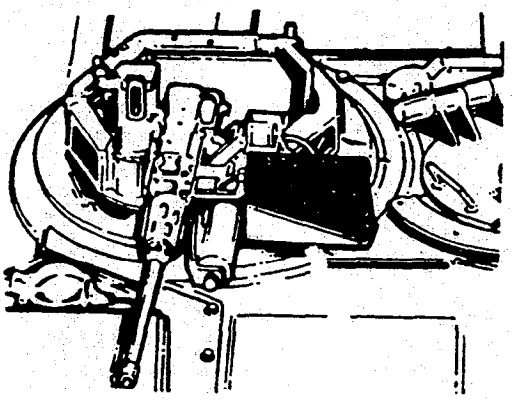
The following items are some tips to be used in addition to the Prep to Fire Checks listed in the -10. These items are either mentioned or implied elsewhere in the-10.

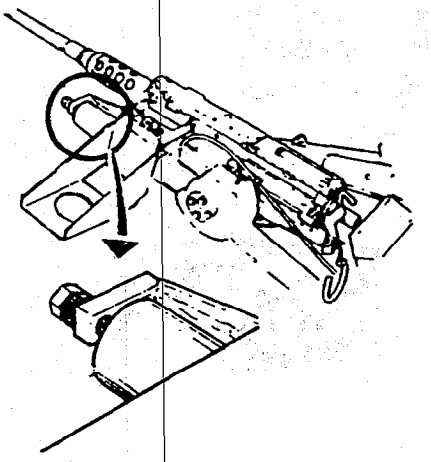
Item

1. When preparing the M2, Cal .50 mount for adjustment, boresighting and firing, the TC should place a full box of .50 caliber ammunition in the cradle. This will ensure proper balance for ease of movement. To prevent the equilabrator spring from falling out of the mount during extreme cold weather conditions always depress the weapon before elevating. Boresight the .50 caliber.

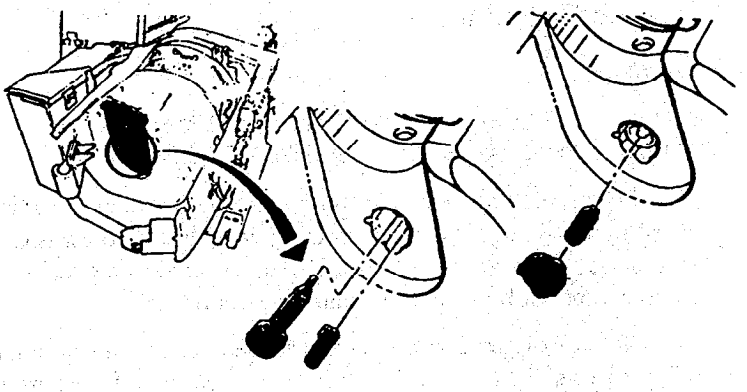
Reference:

M-1, page 2-164, TM 9-2350-255-10-2
M1A11, page 2-176, TM 9-2350-264-10-2



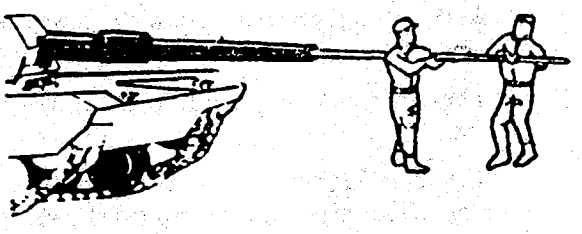


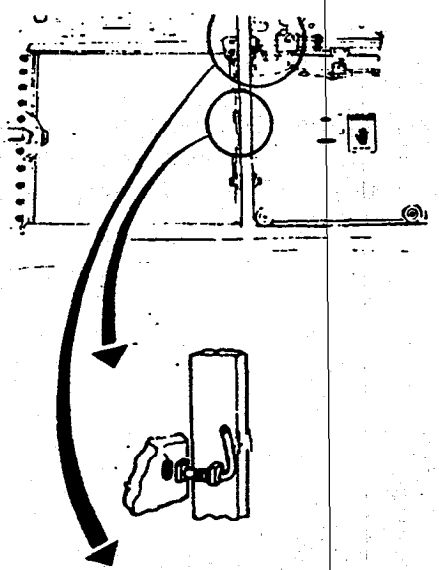
2. Due to excessive vibration of the M1 tank, the firing pin should be physically checked prior to, during, and after firing. The loader simply removes the pin and twist all the components together to ensure they are tight. This effort will reduce the number of misfires which occur. By squeezing the end of the firing pin spring so that it fits snugly over the firing pin these two items can be removed and installed quickly (under 30 seconds). This item should be checked as a part of Prep to Fire Checks and if a misfire occurs.

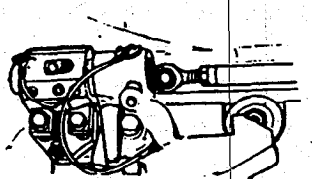


3. Loaders need to clean the collector sponge **daily!** While cleaning the collector sponge the loader should also inspect the top of the Gun Turret Drive Electronics Unit (GTDEU) to ensure no FRH has accumulated on the top or around the cables. If FRH has collected the area must be cleaned immediately.

4. After the gun tube has been scrubbed with CLP and swabbed dry, apply a clean coat of CLP to the gun. The crew should also ensure the muzzle end of the gun stays clean and rust free.







5. Inspect the ready ammo door latching mechanism to ensure it is secured and not loose due to vibration. When the ammo door is opened automatically there should be no binding of the latching mechanism and actuator shaft. If binding occurs check the two 9/16" mounting bolts in the front of the latching mechanism and the two mounting 9/16" bolts located on the inside of the ready ammo door to ensure they are tight.

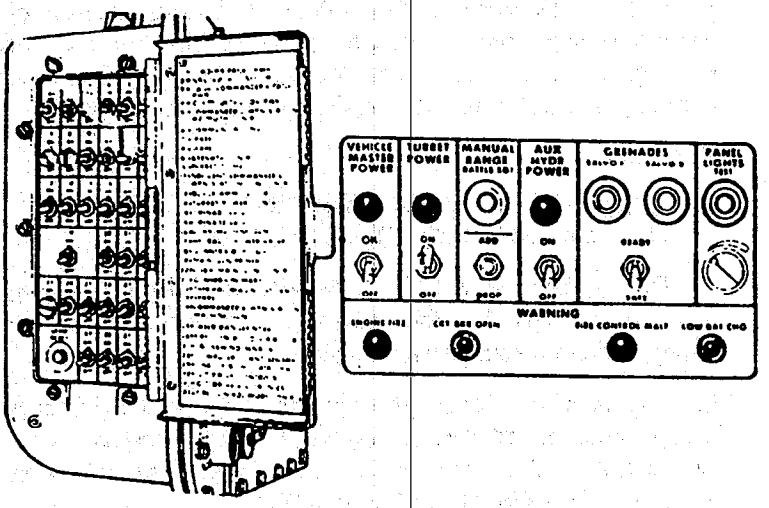
Reference:

M-1, pages 2-301 - 2-302, TM 9-2350-255-10-2
M1A1,1A1, pages 2-316 - 2-317, TM 9-2350-264-10-2

6. Commander must know he can "clear" the "circuit breaker open light" by either depressing the reset button on the turret networks box, or the panel test light button on the Tank Commander's Control Panel (TCCP).

Reference:

M-1, page 2-333, TM 9-2350-255-10-2
M1M1A1,1A1, page 2-352, TM 9-2350-264-10-2

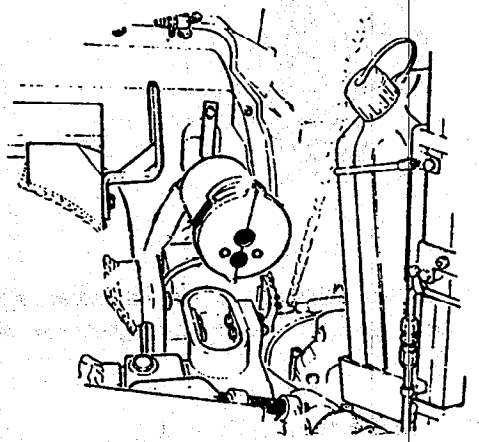


7. After the tank has been boresighted, screened or zeroed the crew should always re-zero the coax machine gun. Crews should follow the procedures as outlined in the -10. If when zeroing the coax machine gun the crew cannot refer the GPS reticle to the strike of the 7.62 rounds they should check the following items:

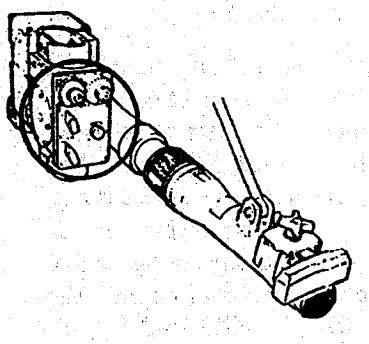
a. Both mounting pins are present and serviceable.

b. That the cover on the smoke box is closed around the 240 barrel and the locking tab is secured in the closed position.

c. That the mounting bolts (one for M1, two for M1A1) for the smoke box are tight and the smoke box is not out of adjustment. Due to tank and machine gun vibration, its possible for these bolt(s) to loosen which allows the smoke box to drop. Loosen the bolts and readjust the smoke box and tighten the bolts and re-zero.



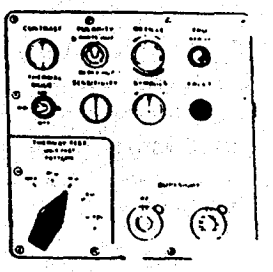
d. To prevent carbon buildup on the GAS boresight knobs from the M240 during firing, crews should cover these knobs so they'll be able to read the numbers or scale (a light coating of WD-40 or a similar lubricant will work).



Reference:

M1-1, pages 2-278 - 2-280, TM 9-2350-255-10-2
M1A1,, pages 2-291 - 2-293, TM 9-2350-264-10-2

8. Place the TIS to "standby". This will allow it adequate time to cool down prior to the TIS checkout. When doing drift adjustment the turret hydraulics needs to be at normal operating temperature. This is normally accomplished by rotating the turret in a complete 360 degree turn 3 times to the left and 3 times to the right and elevating/depressing the main gun at least 3 times.



Reference:

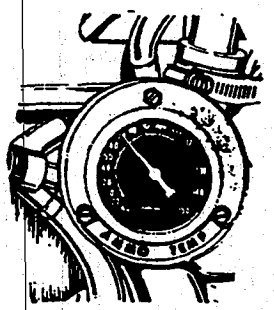
M-1, pages 2-192 - 2-193, TM 9-2350-255-10-2
M1A1,, pages 2-204 - 2-205, TN 9-2350-264-10-2

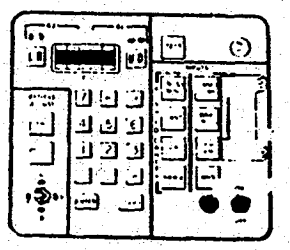
9. Only update the MRS if the last time the tank was boresighted the MRS was also boresighted. If the MRS was not initiated during boresight, a MRS update will not reestablish boresight.

10. When performing the data check, manually input the ammunition's correct temperature in the computer. This is dependent on and when the ammunition was transferred on board the tank and the amount of timeit has been on board. After data checks are complete, gunners should always leave the CCP door open and power "ON" during operation of the Fire Control System (FCS).

Reference:

M-1, pages 2-193 - 2-202, TM 9-2350-255-10-2
M1A1, pages 2-205 - 2-214, TM 9-2350-264-10-2

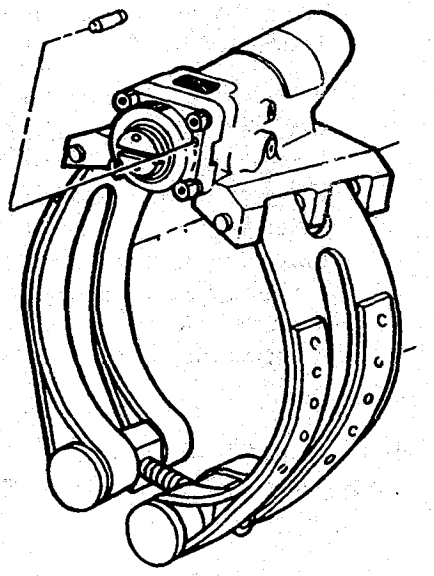




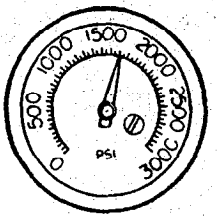
The following steps are located in Table 2-1 of PMCS and are not normally listed as a part of the prepare to fire checks, but they are extremely important for crews to perform prior to firing.

Reference:

M-1, PMCS, pages 2-31 - 2-81, TN 9-2350-255-10-1
M1A1, PMCS, pages 2-33 - 2-91, TM 9-2350-264-10-1



11. Keep a spare condensation absorption capsule, if available, on the vehicle and replace it when the MRS shows signs of condensation. If condensation drops form or condensation covers the entire glass surface see your turret mechanic. Before the MRS is reinstalled after service inspect the mount on the main gun and ensure it is free of rust, dirt and built up paint. Inspect the two screws on the "mounting foot" on the MRS and ensure they are properly seated. The gunner should place the MRS lever to "in" and depress the boresight button on the CCP when mounting the MRS. By doing this a crew will ensure the MRS is within acceptable tolerance with the GPS after it is tightened and torqued in place.



12. The driver must check batteries daily. This is especially true if the tank has been idle for extended periods of time or if the tank has been static with the engine off and FCS powered up.

13. The lower the hydraulic fluid the more "slop" or "play" in the system when in normal mode, and the more the aux pump will activate when the engine is not running.

Boresighting

Reference:

FM 17-12-12-1, Change 2, Appendix B

Improper boresighting, or failure to boresight is a leading cause of target misses. During the AAR of a crew who has had problems hitting targets, (assuming that the fire control system was fully operational) inevitably the problem can be traced to improper boresight procedures. These errors often include using a non-calibrated muzzle boresight device, improper inputting of computer correction factors, and failure to perform MRS boresight.

This problem is directly related to the previous topic. Crews are unfamiliar with the proper procedures and the correct references. This problem can be combatted again by presenting a series of classes to crews that includes how, why and when boresighting is performed and the importance of properly following procedures outlined in FM 17-12-1. This class should include individual crew duties, communications between crew members, the boresight panel, etc.

Even assuming the crew has a fully operational tank that has been properly prepared, the probability of hitting a target at a given range, firing either training or service ammunition, is always less than 100%. Any degradation to the system caused by the crew's failure to properly prepare the tank will further decrease their probability of hitting a target.

Night Boresighting

Despite the best intentions of the unit chain of command, the platoon pulled into the BP after night fall. Preparation began, and at dawn the enemy attacked. The platoon was overrun. The "killed" six vehicles out of the MRB that attacked their position. One reason for so few 'kills' was that no one had boresighted their tanks. The reason given was that it had been dark. While boresighting at night is not anyone's first choice, it can be accomplished.

Prior to departing garrison, consideration must be given to what kind of boresight panel or target will be used in the field. The target must be visible to all sights, both day and night, Examples are:

- .50 cal can with charcoal (for heating) and a contrasting white dot painted on it.
- Any POL container marked the same way.
- A small boresight panel, 18"x18", quartered, colored with sand and OD paint.
- Any object in the tank's sector that has a clearly defined aiming point and that has a thermal signature, or can be heated.

The TC uses a chemlight or filtered flashlight to assist in seeing the aiming point of the MBD. The aiming point on the boresight target is illuminated with flashlights or chemlights, and heating pads. The TC directs the gunner on to the aim point of the boresight target.

- The gunner looking through the GPS, should see the illuminated point on the target and toggle the GPS reticle to the aiming point.

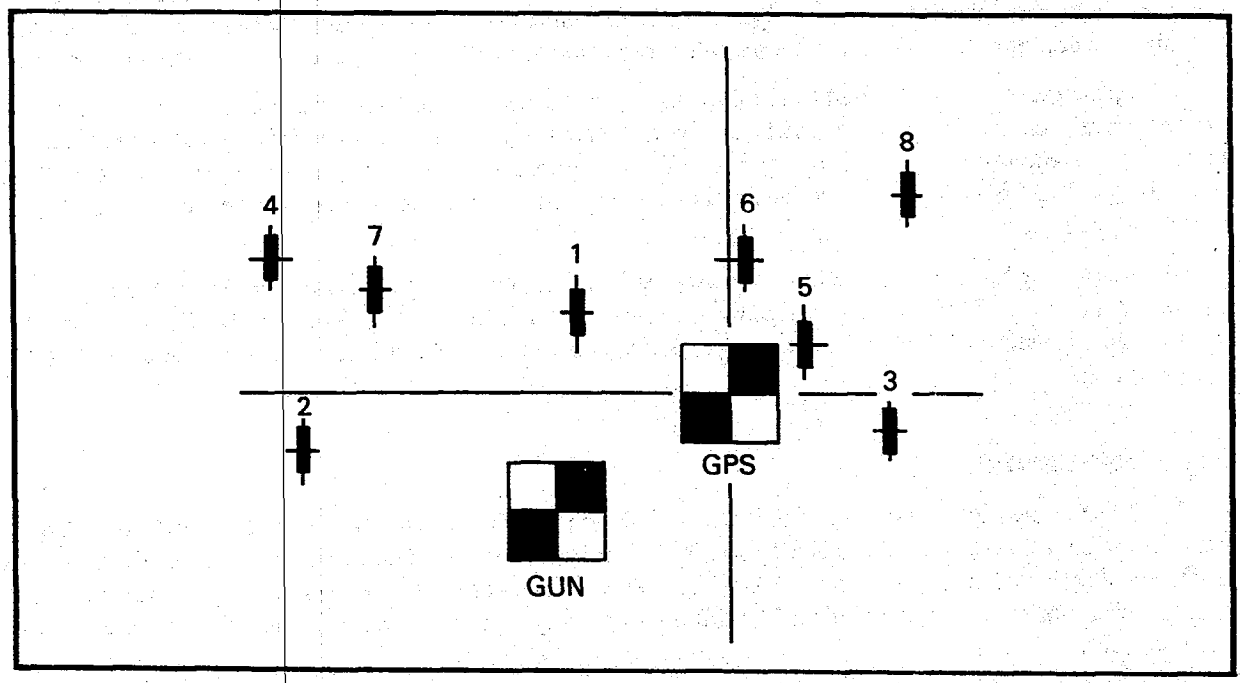
- When the gunner has referred the GPS, the TC instructs the gunner to perform a G-Pattern and confirms lay of the gun with the MBD.
- After completing boresighting of the GPS the gunner will turn on the TIS and adjust the picture. The gunner should see the heated point of the boresight target and refer his TIS to it.
- The TC removes MBD and has gunner do an MRS boresight. TC will illuminate the MRS.
- Complete boresight check.

Armament Accuracy Checks

Reference:

FM 17-12-1, Change 2, Appendix B

A subject related to prep-to-fire checks is the conduct of Armament Accuracy Checks. These checks are found in FM 17-12-1. While not a panacea, these checks can be useful in detecting previously unnoticed fire control system faults. A class should be conducted to explain to crews how, why and when these checks are to be performed. This will provide the basis for ensuring that the fire control system is functioning properly and that problems are identified. Crew competency in this area will enhance understanding of fire control function, and combat mythology in the turret. AACs should be performed by the crew, not the master gunner.



TCPC

Reference:

FM 17-12-1, Change 2, Chapter 8

A training event that often receives little or no attention is conduct of the Tank Crew Proficiency Course (TCPC). This exercise can be used to hone several critical skills. After the crew has had the opportunity to fine-tune the interaction of the various members, the course can be used to practice degraded mode gunnery techniques. Too often we allow our crews to practice "advance notice" degraded gunnery. On a live fire range it's not uncommon

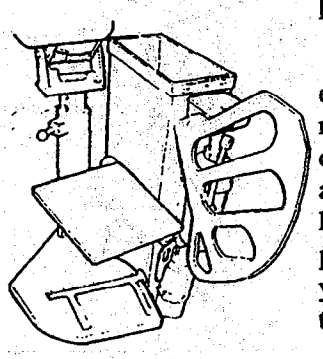
to hear the following; "B13, your next engagement is battlesight fired from the GAS", "B13, prepare for a GAS engagement", or "B13 are you ready for the GAS engagement". The same coaching is present in the COFT, or an exercise is repeated over and over until the crew successfully completes it. Unfortunately NTC live fire is not as accommodating as our training. Drastic, rapid environmental changes can degrade lasers and thermal sights. The pounding and rough use a vehicle takes during a rotation can cause a multitude of no-notice degraded gunnery engagements. Like anything else, if you don't train for the eventuality, when it does occur you'll be ill prepared.

Commanders Station

Reference:

M-1, page 2-151, TM 9-2350-255-10-2
M1A1,1A1, page 2-163, TM 9-1250-264-10-2

Climb aboard one of your tanks and look down at the TC. Is he straining on tiptoes to see through his forward unity periscope? Can he stand flatfooted and view the battlefield through the gap between the vision blocks and the hatch when it's in the open-protected position? If the answers are yes and no respectively, then your tank commander is not prepared to effectively fight his tank. Procedures for preparation of the commander's station are outlined in Vol. 2, of your -10. If these platforms and seats are not adjusted correctly it greatly reduces the commanders ability to button up, lay the gun, acquire targets and operate in the open protected or closed hatch mode. If these items are not adjusted to a combat ready posture, they can cause serious injury or death in the event the crews needs to escape the tank. TC's should be discouraged from fighting the tank sitting down, since this almost always means the stand will be maladjusted.



Load Plans

The Abrams, especially the M1A1, is not known for it's spacious interior. A poorly executed load plan, or no load plan at all, not only clutters the interior of the tank, it makes performing routine crew duties difficult, if not impossible. More significantly, a cluttered turret is dangerous. It prevents proper installation of guards and will slow any attempt at evacuation, should it become necessary. Despite this, tanks routinely execute live fire with the interiors looking as if a grenade had gone off inside. Establish a load plan, or use the Ft. Knox load plan detailed in ST 17-184, M1A1. Regardless of what plan you use, enforce it. Make it a Pre-Combat Inspection (PCI) item and don't allow a tank to leave the cantonment area or Assembly Area unless its straight.

Fire Distribution

Reference:

FM 17-12-1, Change 2, Chapter 8

Climb up on tank in a defensive position and ask the TC or gunner to point out the left and right limit of his sector. The response usually given is an arm pointed to the far left and then the far right, an area which encompasses the entire engagement area assigned to the platoon or company. Ask where the trigger point or line is that will be used for initiation of fires, and the horizon is usually indicated. When the dust settles and the smoke clears, some targets have been hit 10 times and a large number remain untouched. TCs will go through the motions of preparing a sketch card, but it will reflect the vast expanse of real estate to the front of the tank. It provides no useful information but allows a "check the block" to be granted sketch card.

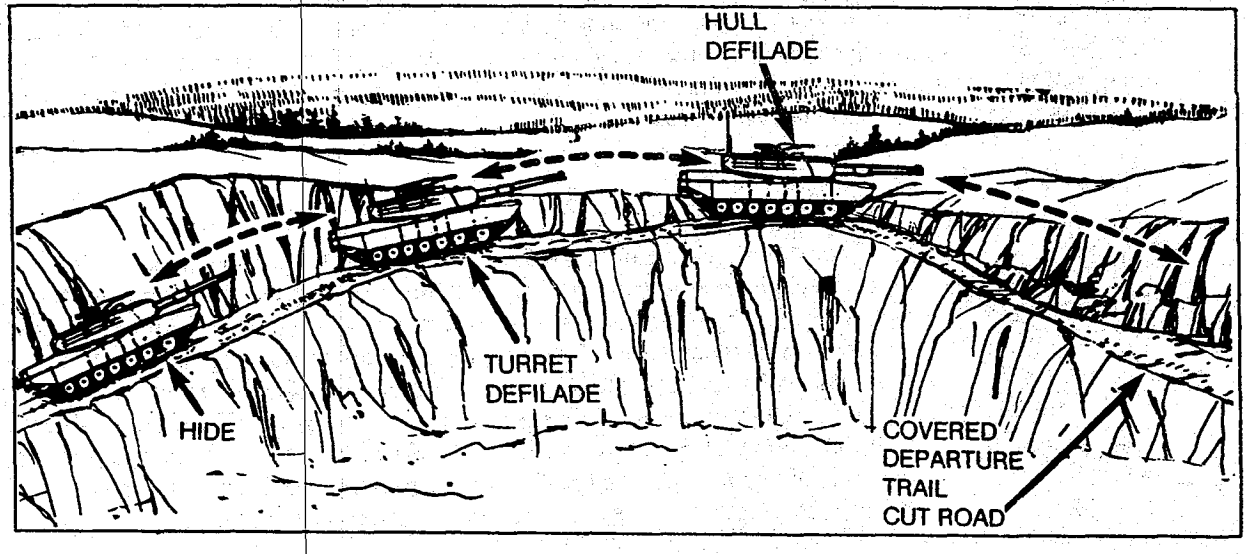
Unit sectors should be broken down into manageable chunks that allow each tank to cover a portion of the platoon's assigned area with minimal scanning. This will help to avoid overkills and allow rapid fire to be brought to bear on every exposed target. Depending on the size of the tank's sector, the TC can split the sector with his gunner by watching for targets outside the gunners field of view. This helps prevent excessive scanning by the gunner, prevent overkill, and decrease engagement time. This fire plan should be developed by first going into the

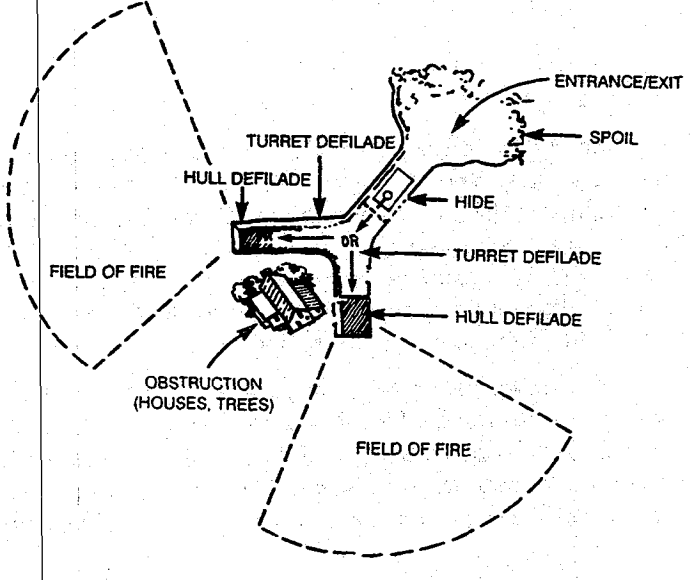
engagement area and then looking back towards the BP to determining vehicle positions. This method will help eliminate dead space, and allow positions to be selected that are not visible to the enemy. If there aren't any existing features to delineate sectors then TRP's will need to be emplaced. The TRP's need to be visible through both thermal and daylight channels. The visibility of the sector and TRP's must be verified from the prepared position. This is also the position from which the sketch card should be prepared. Often a tank will be parked "high and dry" next to its fighting position and the gunner will be sitting on top of the turret preparing his sketch card. Small wonder that after the fight the crew complains that they couldn't see their sector when in the fighting position.

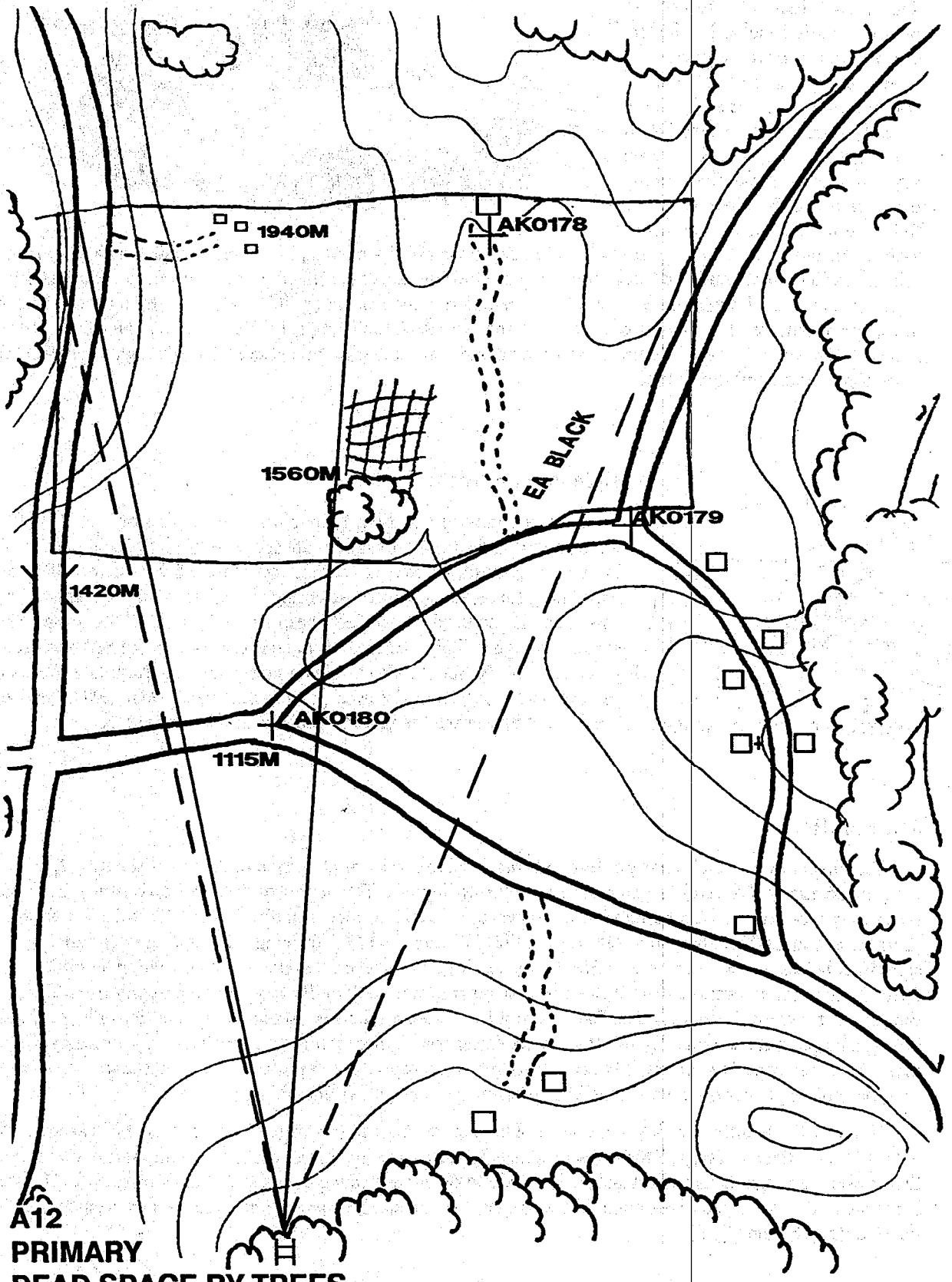
Coordination between adjacent platoons and companies is another key factor that will assist in preventing overkills and ensuring that all parts of the EA are covered by someone. Frequently if the TC of a tank on a platoon flank is asked who is positioned to his left or right. The response is either, "I'm not sure" or it's incorrect. This flank coordination should be verified during PCIs or a walk around the BP. Leaders should also use TRP's to define platoon or company/team sectors of responsibility within an engagement area or sector.

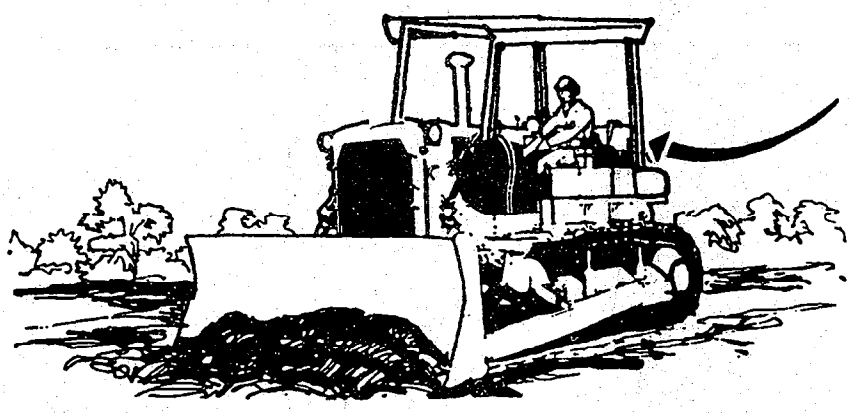
Positions

In positioning individual vehicles, locations should be chosen that afford the opportunity to modify or reinforce existing terrain. This is much more economical, in terms of blade time, than trying to 'muscle' a position out of bedrock. Several examples of tank fighting positions can be found in FM 71-1. A few examples are included here.

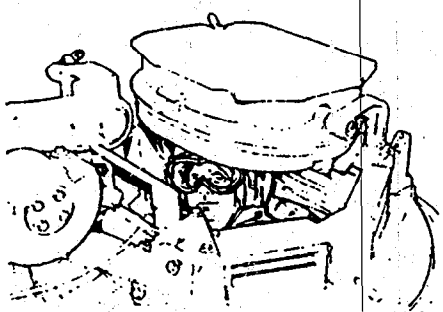





1940M
AK0178
1560M
EA BLACK
AK0179
1420M
AK0180
1115M
A12
PRIMARY
DEAD SPACE BY TREES
CANNOT OBSERVE AK0179



When preparing a fighting position, it is critical not to allow the position to be dug too deep. Tank crews often fail to "proof" the position until long after the engineer assets have departed. A common sight at Live Fire is for one or two tanks from a platoon to be out of the fight because their 'hole' is too deep, and their main gun cannot clear mask. Some crews discover this only after firing the first round and being showered with rocks and sand. A method that will help alleviate the problem is to place marks (engineer tape) on the dozer rails that will indicate hull and turret down depth. Once the dozer has dug the hole deep enough so that one of the marks is almost no longer visible, have the dozer pull out and the tank pull in to 'proof' the position. The gunner or loader should ensure the gun is clear when the tank is on the firing step. The position should also be viewed from the EA when the tank is in turret down to ensure that the position is actually deep enough to protect the tank from observation and direct fire.



PROTECTED OPEN POSITION

Extension Addicts

In a fast moving situation, there's a lot happening on the battlefield. Its imperative that the tank commander not spend all of his time glued to the GPSE. in the open position, the TC should be scanning his sector. If nothing is happening there, he should be scanning the adjacent tanks' sectors to see if assistance is required, or to alert these crews that they have targets in their sector. Though visibility is more restricted in the open-protected or closed hatch positions, the TC should also be scanning the area for targets. If he's stuck to the extension, a third of the eyes on the tank (gunner/driver/TC) are wasting their effort by viewing the indentical picture the gunner sees.

Ammunition

Training ammunition is nearly ballistically matched to service ammunition out to approximately 2,000m. After that, the accuracy of the training ammunition begins to degrade. The degree of degradation is primarily dependent on the type of training ammunition. The accuracy of 120mm cone stabilized SABOT (M865) falls off more dramatically at 2,000m, than spin stabilized (M724) lO5mm SABOT. Training ammunition is designed to require significantly less down range area to fire it than service ammunition. The point is that training ammunition is less accurate than service ammunition at extended ranges (beyond 2,000m). Both types of ammunition are less accurate the farther they travel. Setting up an EA that requires 3-4,000m shots is a waste of ammunition. The probability of hitting a target at those ranges is low. If you were firing service ammunition at a real Threat, your probability of kill at those ranges would be minimal. What does that mean? You've got to position your tanks, and shape the EA so that the bulk of your tank shots are the high percentage ones (<2,000m and on the flank).

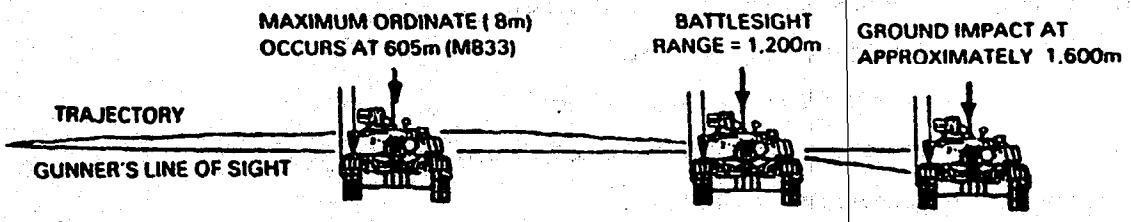
To assist the Bradleys or ITV's, a tank should provide range to the targets so that the TOW's aren't launched outside their effective range. This will also assist Bradley crews from wasting 25mm ammunition on targets past their effective range. Every effort should be made to determine range bands in the EA, so that if LRF's become inoperative due to either environmental factors or maintenance, the approximate range can be indexed into the Fire Control System (FCS).

Battlesight

Reference:

FM 17-12-1, Change 2, Chapter 6

Units often misunderstand battlesight gunnery, what it is, how it works, and who establishes the battlesight range. It's a commander's perogative and responsibility to adjust battlesight ranges based on the factors of METT-T. It is essential, however, that someone in the unit has broken out their firing tables to determine what battlesight range will allow the tanks the opportunity to maximize hits based on the ballistic characteristics of the ammunition being fired. Crews should be instructed on the significance of a particular battlesight. Engaging a 2,100m target with a 1,200m battlesight, and aiming center of mass is a guaranteed short-line!



Note. When battlesight range is 1,200 meters, impact zone extends from the firing tank to approximately 1,600 meters.

Platoon Gunnery

Reference:

FM 17-12-1, Change 2, Chapter 11

The gunnery tables have been criticized for being too pristine. They don't prepare a crew to execute on a dirty battlefield where dust and other obscurants can render an LRF inoperative. They're not stressful enough.

24th Infantry Division has developed a Platoon Battle Run which incorporates METL tasks and gunnery skills. The range is 'dirtied' by use of smoke generators/pots, and heated hard targets. Platoons execute an exhausting series of tactical missions in the maneuver area prior to entering the live fire phase. Use of attack helicopters and indirect fires are integrated into the scenario. This training, which more closely replicates NTC Live Fire, has proven its worth in unit performance during recent rotations.

FM 17-12-1

Change 4 to FM 17-12-1 will focus on updating Chapter 11, Tank Gunnery Tables. TT XII will be changed from its current 'lock-step' format, to a more generic exercise. It will allow commanders the flexibility to structure the exercise around critical METL tasks. Emphasis on reactive target arrays and a 'dirty' battlefield will also be included. Expect to see a coordinating draft the latter part of 2nd QTR 1990.

Crew Evacuation

There are many manuals (soldier's manual, -10, FM 17-12-1) that outline procedures for evacuating the tank under a variety of circumstances. One area that has not been previously covered has been evacuation of the tank when an ammunition fire has occurred in the crew compartment. The following drill can be practiced during routine maintenance, as concurrent training during Tank Tables, and every other opportunity.

TASK. Evacuate an 141A1 Tank During an Ammo Fire

CONDITIONS.

Vehicle.
- a fully equipped, operational M1A1 Tank is in a hull down position or on the move.
- all safety guards are in position
- main gun is loaded and is considered a "hot" gun

Note. "Hot" gun is defined as one or more rounds fired in the previous minute.

TC's station
- TC in prescribed uniform
- TC's stand is adjusted for standing position
- seats and platforms adjusted IAW -10
- TC hatch in open protected or closed positions

Loader's Station
- loader's hatch is in the locked position (closed)
- GTD switch is in "powered"
- main gun loaded weapon on "safe"
- loader is in prescribed uniform, CVC cord hooked up

Gunner's Station
- gunner's seat is adjusted
- gunner is in prescribed uniform, CVC cord hooked up
- scanning in three power

Driver's Station
- driver's hatch in the closed position
- T-Bar in fully extended position
- Night Vision Viewer installed, power cable installed
- engine running, shift control to "N"

  or

- tank moving 15 mph
- driver in prescribed uniform CVC Cord hooked up

INSTRUCTIONS TO THE CREW

The purpose of this task is to determine our ability to evacuate the crew in case of an ammo fire in the crew compartment. Assume the tank has just completed an engagement and the main gun is loaded with HEAT and is considered "hot." The tank commander has issued the command of "battle carry SABOT." As the loader removes the HEAT round, the alert of "ammo fire" will be given (Simulating the removed round is smoldering/burning).

You will have 15 seconds to evacuate the loader, gunner, TC, and driver.

Note: If Driver's Night Vision Viewer is installed, the driver will have 25 seconds to exit.

TC	GNR	LOADER	DRIVER
		Announce "ammo fire"	
1. Stop breathing	Stop breathing	Stop breathing	Stop breathing
2. If moving, "DVR stop"	Disconnect particulate hose	If round is only partially out of chamber when fire is noticed, attempt to rechamber once only.	If moving, stop tank, pop hatch, open. Push T-Bar to stowed position. Loosen Night Vision Viewer wing nuts. Drop sight to left of driver's seat.
3. *Open TC's hatch, disconnect particulate hose	Mode select to manual	Disconnect particulate hose	*Open hatch, disconnect particulate hose
4. Exit tank	Exit tank	Exit tank	Exit tank
5. Assist Gnr	Exit TC's hatch	Assist Gnr	Pull external fire extinguisher handle
6. Get to cover behind vehicle	Get to cover behind vehicle	Get to cover behind vehicle	Get to cover behind vehicle

Note. 1. NBC conditions.

2. Gunner excapes his position by grabbing the tank commander's sight extension, turret hand hold and pulls himself up and out while facing forward. He does not to turn around and face the TC's position.

3. Tank commander must be able to open the hatch while standing or in sitting position. The TC should be standing on the lower TC platform and have it adjusted IAW-10. When sitting and the hatch is closed, he should be able to use the left hand to unlock the hatch, cock it and move his left to the locking lever, his right hand is placed palm up on the under side of the hatch. In one motion he should be able to unlock with his left hand and push the hatch to the full open position in one movement (it should not lock in the open protected) and then exit the tank. Seat adjustment is critical so that the right arm is not extended out. When in the open protected the TC should always be standing and his upper and lower platforms adjusted IAW -10. He will follow the same procedures for opening the hatch. Once again it is critical that his platforms are adjusted so his arm is not over extended.

4. Ensure the cord going to CWS Fire Control handle is out of the way so the gunner does not become tangled in it.

5. CVC cord should never be tied, taped, or looped together. These will hamper escape.

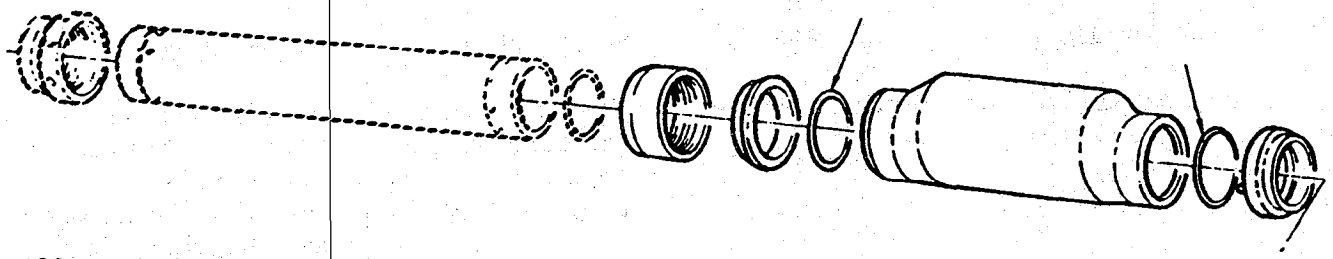
Flarebacks - M256 - 120mm Gun

A recent message (111330Z Dec 89) from CDR, AMCCOM, has recommended the following changes to maintenance procedures for 120mm gun.

- Replace seals whenever the bore evacuator is disassembled.
- Requisition seal NSN 5330-01-280-6787 for replacement. This seal is black as opposed to the earlier version which is blue.
- Strictly follow the procedures outlined in TM 9-2350-264-10-3 for assembly/disassembly of the bore evacuator.

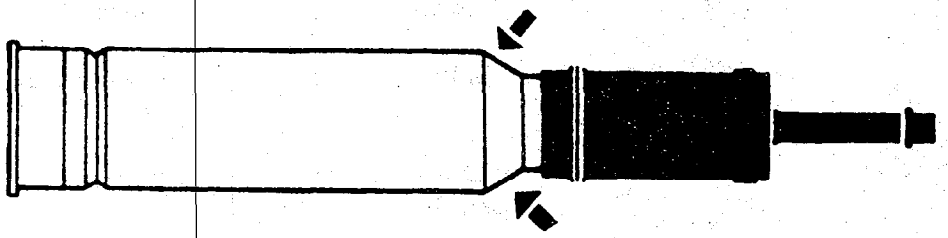
- Set the breech opening cam as slow as practical, consistent with proper base extraction.

AMCCOM believes following these steps will assist in avoiding/minimizing flarebacks. Any incidence of flarebacks should be reported to the local Logistics Assistance Representative.



120mm Ammunition - M831

Recent studies by PM TMAS (Program Manager - Tank Main Armament Systems have determined that if you have an M831 round that has white (silver scraped off) showing on the forward shoulder, it should not be loaded. The white material is exposed nitrocellulose that is explosive and extremely hazardous. The round of ammunition should be turned in.



M256 - 120mm Gun - Ammunition Loading

Reference:

M1A1, page 334, TM 9-2350-264-10-2
AMCCOM Msg, DTG 152230Z Dec 89

To prevent damage to the cartridge,inspect the ammo storage racks for burns or deformed edges. Ensure that the loading tray is properly aligned to prevent damage to the cartridge.